

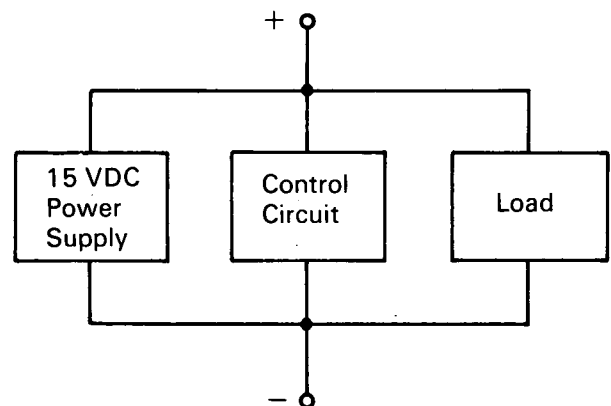
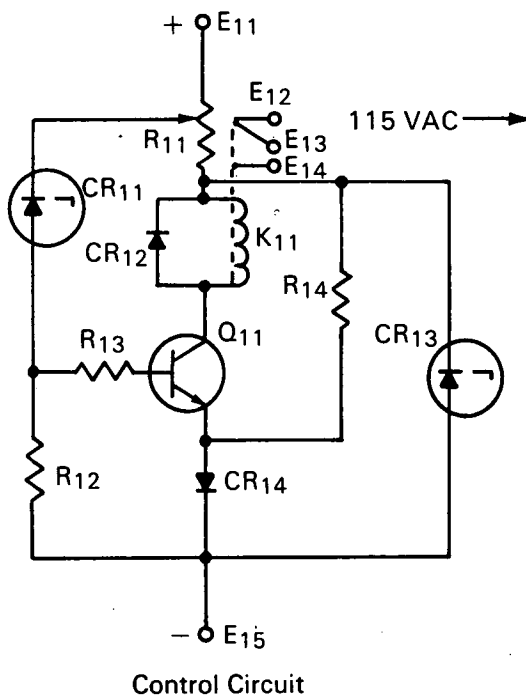


AEC-NASA TECH BRIEF



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Electronic Circuit Provides Accurate Sensing and Control of DC Voltage



The problem:

To design an electronic circuit in which the current in the relay coil is held to zero for all input voltages up to slightly below the threshold level. A common method of sensing and controlling dc voltages is through the use of relay coils and amplifiers. The primary disadvantage of such a technique is that a current proportional to the sensed voltage is always in the relay coil, which tends to make the circuit susceptible to external disturbances such as electrical noise and mechanical vibrations.

The solution:

A circuit in which the control relay is driven by a switching transistor that is biased to cutoff for all input up to slightly less than the threshold level.

How it's done:

In the circuit shown, the control circuit is used to very accurately control the 15 volt, dc power supply providing power to the load. For an input voltage of 15, the zener diode CR13 will conduct and regulate the voltage to relay K11 and resistor R14. A constant current will be maintained in diode CR14. The forward

(continued overleaf)

voltage in CR₁₄ will be at the same level as the emitter of switching transistor Q₁₁. R₁₁ is adjusted so that zener diode CR₁₁ does not conduct. Under these conditions the base of Q₁₁ will be at zero volt. Q₁₁ will be cut off and the voltage across K₁₁ will be zero. As the input voltage increases above 15 vdc, CR₁₁ will conduct and a potential difference (ΔV) will appear at R₁₂. When this potential difference exceeds the Q₁₁ base-to-emitter voltage, current in Q₁₁ will activate relay K₁₁. When K₁₁ is activated, contacts E₁₂ and E₁₃ are broken which cuts off and locks out the 15 volt power supply controlled by the control circuit.

Note:

Inquiries concerning this innovation may be directed to:

Technology Utilization Officer
AEC-NASA Space Nuclear Propulsion
Office

U.S. Atomic Energy Commission
Washington, D.C. 20545

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Patent status:

No patent action is contemplated by AEC or NASA.

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